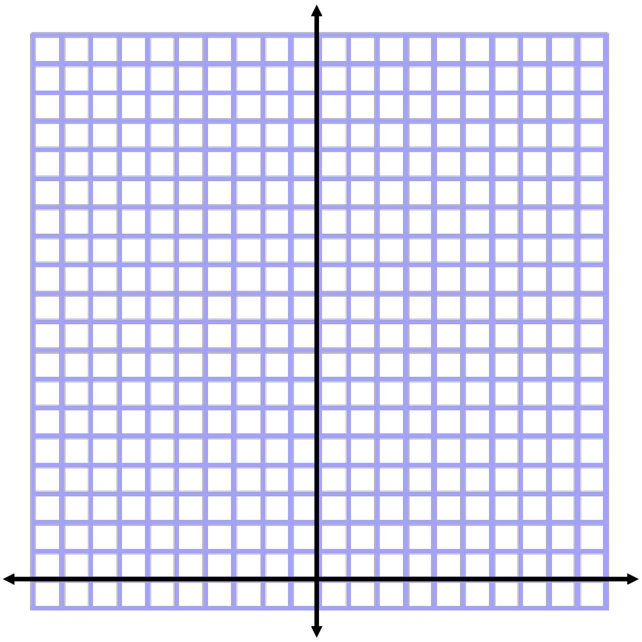
L1(5.1)-Reflecting & Stretching Quadratic Relations

The simplest quadratic relation is $y = x^2$, called the parent function.

x	$y = x^2$
-2	
-1	
0	
1	
2	



May 2-4:13 PM

Compare the graphs and TOV for $y = x^2$, $y = 2x^2$, and $y = \frac{1}{2}x^2$. What do you notice?

x	$y = x^2$	$y = 2x^2$	$y = \frac{1}{2}x^2$
-3			
-2			
-1			
0			
1			
2			
3			

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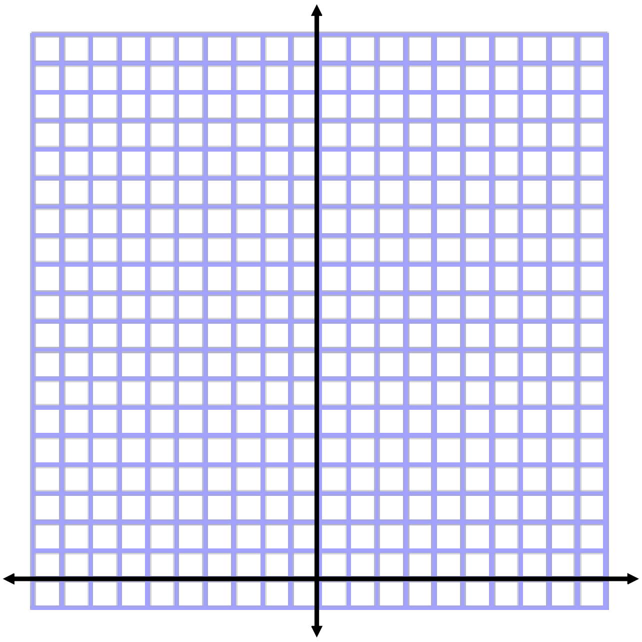
Graph $y = x^2$, $y = 2x^2$ and $y = \frac{1}{2}x^2$.



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See Geogebra quadratic translation demo
(click here for link)

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$y = x^2$ a = 1, so a > 0, parabola opens up

$y = -x^2$ a = -1, so a < 0, parabola opens down
vertical reflection

The sign of a determines if there is a vertical reflection of the parent function, $y = x^2$.

Nov 8-1:22 PM

When 'a' is a number other than 1 or -1, we say that $y = x^2$ has been vertically scaled.

For a vertical scaling, we only care about the size, or magnitude, of 'a', so we ignore the sign. This is called the "absolute value", and has the symbol $|a|$.

When $|a| > 1$, the graph of $y = x^2$ gets thinner. The parent function undergoes a vertical stretch.

e.g.,

When $0 < |a| < 1$, the graph of $y = x^2$ gets wider. The parent function undergoes a vertical compression.

e.g.,

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Ex.1. Describe the transformations to $y = x^2$ that yield the following:

(a) $y = \frac{1}{4}x^2$ (b) $y = -3x^2$

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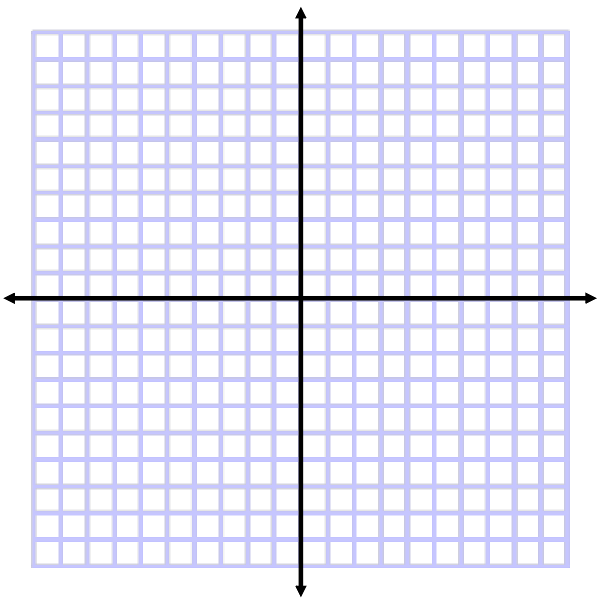
Ex. 2. Graph (a) $y = -0.5x^2$ (b) $y = 3x^2$

x	$y=x^2$



Apr 11-8:49 PM

Assigned Work:

p. 256 # 1, 2, 4 ,5 ,8

Mar 20 - 4:57 PM